

TALKING POINTS

The technology for refining alumina from bauxite and for electrolytically reducing aluminum metal out of an alumina-laden bath are both over 100 years old. Over the past few decades, and particularly since the rapid increase in energy costs, the efficiency of that technology has been continually improved. However, the most improved aluminum reduction cells are now approaching the theoretical limits of energy efficiency for the Hall Process.

ARCO's two aluminum reduction plants both employ very efficient operating technology. The Columbia Falls, Montana smelter is 32 years old and uses an older version of the Hall reduction technology. However, since the merger, the process has been substantially upgraded and with the completion of an improvement program now underway will approach the operating efficiencies of the newer version of the Hall cell.

Our Sebree plant employs the newer "prebake" cell and operates at an energy efficiency level close to the best smelters in the world.

While today's refining and "smelting" technology is long established, the industry appears to be poised for major technology breakthroughs which could be commercialized within a decade. Two technologies appear to have the greatest near-term potential.

ARCO Metals is in the final stages of negotiations with Alcoa to jointly pursue the commercialization of a process to produce aluminum from aluminum chloride, a process which uses 30% less energy than the current technology, is less capital intensive and can be curtailed or expanded more cheaply than today's smelters. Moreover, the aluminum chloride can be produced from clays found in abundance in the U.S., thereby freeing future production from foreign bauxite dependence.

The Japanese government is coordinating a multi-company research project for the direct reduction of aluminum from bauxites or clays in a blast furnace type operation. This technology also holds out the possibility of reduced energy consumption. While we don't believe direct reduction has the nearer term commercialization potential of the chloride process, we intend to closely monitor the progress of that research.

RELEVANT FACTS

SMELTER ELECTRICAL EFFICIENCY AT FULL PRODUCTION

	<u>DCKWH/LB</u>
Columbia Falls - now	8.0
- 1987	6.7
Sebree - now	6.8
Best existing "Hall" Smelter - now	6.0
Theoretical limit for Hall Smelter	5.5

COMPARISON OF ALUMINUM TECHNOLOGIES

	ELECTRICITY USAGE *	CAPITAL COST (\$/TON)	PRODUCTION COSTS (¢/LB.)	FLEXIBILITY RATING	ESTIMATED COMMERCIALIZATION
HERMET PREPARE ** TECHNOLOGY	6.0 DCKWH	\$ 54	69¢ ***	LOW	OPERATIONAL
CHLORIDE PROCESS **	4.0 DCKWH	\$ 54	57¢	HIGH	8 - 10 YEARS
DIRECT REDUCTION	2.5-3.0 DCKWH	\$ 54	57¢	LOW	15 - 20 YEARS

* EXCLUDES THE IMPACT OF OTHER ENERGY SOURCES

** BASED ON INFORMATION TAKEN FROM AD-120 PROGRESS REPORT NUMBER 2, ESCALATED FOR INFLATION.

*** BASED ON POWER COSTS OF 26 MILLS/KWH AND DELIVERED ALUMINA COSTS OF \$246/TON.